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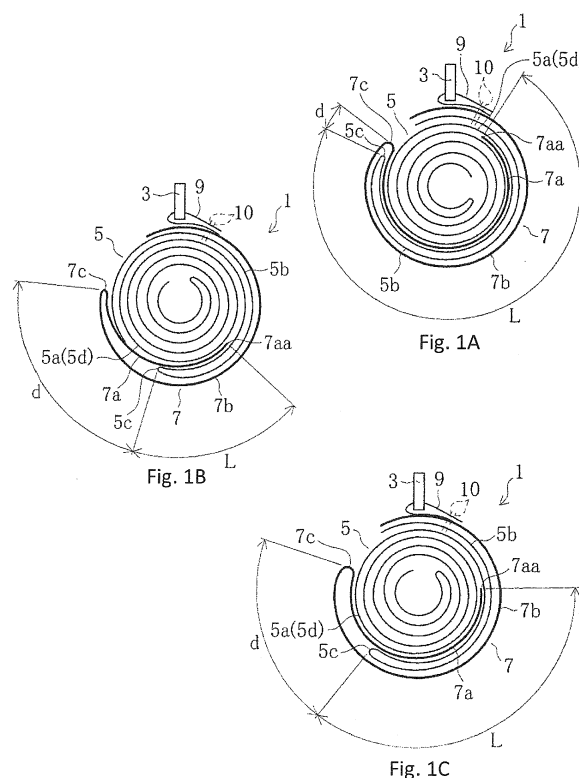
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(54) **CURTAIN AIRBAG DEVICE AND STRUCTURE FOR MOUNTING TO VEHICLE**

(57) An edge of a pillar trim covering is not broken and scattered when an airbag is deployed.

An airbag device 1 has an airbag 5 that is wound in a roll state, that is mounted in a vehicle longitudinal direction of a vehicle and that is deployed in a curtain-like manner in a vehicle compartment by a gas generated by an inflator 4 in case of emergency. A cover cloth 7 is provided so as to be wound to cover at least part of an outer circumference of the airbag 5 extending in a longitudinal direction. The cover cloth 7 has a first folded-back part 7a that is formed by folding back one end of the cover cloth 7 in a circumferential direction of the outer circumference of a cross section, which is perpendicular to the longitudinal direction, of the folded airbag. An edge of the outer circumference of the airbag 5 is held between the first folded-back part 7a and the other end 7b of the cover cloth 7.



Description

Technical Field

[0001] The present invention relates to a curtain airbag device in which an airbag is deployed in a curtain-like manner along a side window in a side collision or a roll-over so as to protect an occupant's head and prevent the occupant from being thrown out to the outside of a vehicle, and a mounting structure of such device on the vehicle. Specifically, it is prevented that an edge of a pillar trim covering (a pillar garnish) is broken and scattered when the airbag is deployed.

[0002] In the following explanation, according to the present application, the terms "above" and "up" denote a ceiling side of a motor vehicle, and the terms "below" and "down" denote a floor side of the motor vehicle. In addition, the terms "front" and "forward" denote a forward direction side of the motor vehicle, and the terms "rear" and "backward" denote a retreating direction side of the motor vehicle.

Background Art

[0003] When a high load is applied on a side of a motor vehicle in a side collision or a rollover, a curtain airbag device causes an inflator to be operated so as to generate a gas and deploys an airbag in a vehicle compartment in the curtain-like manner in a vertically lower direction along the side window.

[0004] As shown in Fig. 9, such curtain airbag device 1 is mounted by using clips 2 and brackets 3, for instance, from a roof side rail RSR toward a front pillar FP.

[0005] The curtain airbag device 1 in the mounting state explained above is covered by a front pillar trim covering and a room head lining (a roof trim covering) inside the vehicle compartment, and is stored at the outside of the vehicle compartment with respect to these trim coverings.

[0006] Further, in the side collision or the rollover, an airbag 5 that is wound in, for instance, a roll state, is deployed by the gas that is generated by an inflator 4. As a result, the front pillar trim covering and the room head lining are pushed toward an inside of the vehicle compartment and are disengaged from the front pillar FP and the roof side rail RSR of a vehicle body.

[0007] After they are disengaged, edges being disengaged from the front pillar trim covering and the room head lining are pushed and expanded toward the inside of the vehicle compartment so that the airbag is deployed in the curtain-like manner in the vehicle compartment from such opening that is formed by being pushed and expanded.

[0008] By the way, for instance, in regards to the airbag that is wound in the roll state, there is a case in which a predetermined position of the airbag in a longitudinal direction is covered by a cover cloth that regulates a deployment direction. In this case, at the time of deploying

the airbag, because a tape that fixes the cover cloth is broken so as to release the cover cloth, the airbag is deployed in a predetermined direction.

[0009] However, depending on a covering condition in which the cover cloth covers the airbag, there is a case in which at the time of deploying the airbag, the cover cloth cannot be released well. In that case, the airbag may be caught inside the front pillar trim covering because the deployment direction of the airbag is changed. When the deployment is continued in such state, there is a possibility that the front pillar trim covering is damaged (refer to paragraph [0008] of Patent Document 1).

Prior Art Document

[0010] Patent Document 1: Japanese Patent Publication Number 2014-65329.

Summary of the Invention

Problems to be Solved by the Invention

[0011] A problem that is solved by the present invention is that there is a possibility that when the airbag is deployed in a state in which the airbag is caught inside of a trim covering, in particular, a front pillar trim covering and a rear pillar trim covering, the trim coverings are damaged.

Means for Solving the Problems

[0012] An object of the present invention is to prevent edges of trim coverings, in particular, a front pillar trim covering and a rear pillar trim covering from being cracked and scattered at the time of deploying an airbag.

[0013] The present invention relates to a curtain airbag device having an airbag that is mountable along a roof side rail of a vehicle in a vehicle longitudinal direction of the vehicle so as to configured to be stored in the vehicle and that is deployed in a curtain-like manner along a side window in a vehicle compartment by a gas generated by an inflator in case of emergency.

[0014] Further, in order to achieve the above object, the present invention includes the following most essential features: the airbag which is folded has a cover cloth that is wound to cover at least part of an outer circumference of the airbag that extends in a longitudinal direction of the airbag; the cover cloth has a first folded-back part that is configured by folding back one end of the cover cloth in a circumferential direction of the outer circumference of a cross section, which is perpendicular to the longitudinal direction, of the folded airbag; and an edge of the outer circumference of the folded airbag is held between the first folded-back part and the other end of the cover cloth.

[0015] In other words, the following is the most essential feature: the first folded-back part is inserted into a folding gap of the folded airbag from an edge of the outer

circumference of the folded airbag.

[0016] In the present invention, the folded states of the airbag may be either a roll state that is configured by winding the airbag or a bellows-like folded state that is configured by bellows-like folding the airbag.

[0017] In the airbag that is wound in the roll state, it is preferred to have a second folded-back part that is configured by folding back an edge of the outer circumference of the airbag in a direction opposite to a winding direction to cover part of the outer circumference of the airbag. In this case, the first folded-back part of the cover cloth is inserted into a gap between a main body of the airbag that is wound in the roll state and the second folded-back part.

[0018] Further, in the airbag that is folded in the bellows-like manner, it is preferred to have a third folded-back part at one end of the bellows-like folded airbag, and the third folded-back part is configured by folding back an edge of the folded airbag so as to cover part of an outside of the folded airbag. In this case, the first folded-back part of the cover cloth is inserted into a gap between a main body of the airbag that is folded in the bellows-like manner and the third folded-back part.

[0019] In addition, in the present invention, from the perspective of securely maintaining the airbag mounted state to the vehicle and of protecting the trim coverings from such as a cracking at the time of deploying the airbag, it is preferred that the cover cloth is thicker or harder than a base fabric that forms the airbag.

[0020] Because the cover cloth has a proper hardness, at the time of deploying the airbag, a cushion base fabric is hardly caught at an edge of the trim covering so that the airbag is smoothly deployed. Further, the damage to the edge of the trim covering is reduced and the cracking of the trim covering itself can also be prevented.

[0021] The hardness of the cloth is measured by measuring the bending resistance according to a cantilever method (Standards: ISO9073-7, ASTM D-5732, GB/T18318-2001, JIS L-1906, JIS L-1912, JIS L-1913, JIS L-1096, and JIS L-1018).

[0022] The bending resistance indicates a hardness and a softness when a cloth is bent and can be measured by a cantilever tester. The cantilever tester has a tilted surface at angle of 45 degrees in regard to a general woven fabric and at angle of 41.5 degrees in regard to a nonwoven fabric and has a smooth flat surface which is horizontal at the time of the installation of the tester and is continuously provided with the tilted surface at an upper edge of the tilted surface.

[0023] On this flat surface, a cloth as a test piece is placed in a manner in which one end of the cloth aligns with a boundary between the flat surface and the tilted surface, the cloth, which is pressed by a flat metal plate from above, gently slides toward the tilted surface, and a scale (a length) is read when a center of the end of the test piece contacts the slope.

[0024] The bending resistance is indicated by the length of the cloth that is extruded and it is shown that

the longer length is the harder cloth. As compared with a cloth of an ordinary airbag, for instance, a webbing that is used for a vehicle seat belt has a high bending resistance (a measured value is long) and hard, therefore, it is in a preferable state. On the other hand, when it is the same material and the same fabric, the thicker fabric has the higher bending resistance (the measured value is long) and hard, therefore, it is in a preferable state.

[0025] In a mounting structure of the curtain airbag device on a vehicle according to the present invention, when the airbag is mounted on the roof side rail and a pillar of the vehicle by using a tab that is attached to a base fabric of the airbag so that the airbag extends in a vehicle longitudinal direction, the airbag is mounted by using the tab that is integrally attached to the cover cloth and the base fabric of the airbag at a mounting position of the cover cloth. The above configuration is the mounting structure of the curtain airbag device on the vehicle according to the present invention.

[0026] The pillar in the mounting structure of the curtain airbag device on the vehicle according to the present invention is a front pillar and/or a rear pillar.

[0027] In the mounting structure, it is preferred that at least part of the cover cloth is overlapped with an edge of a roof trim covering side of a pillar trim covering of the pillar. Alternatively, it is preferred that the cover cloth is disposed at a seam between the pillar trim covering and a roof trim covering.

[0028] According to these configurations, at the time of deploying the airbag, a direct damage that is affected to the edge of the trim covering can be reduced so that the cracking of the trim covering can be prevented.

[0029] In the present invention, in regard to the cover cloth that covers the outer circumference of the airbag, the first folded-back part that is provided at one end of the cover cloth in a circumferential direction of the outer circumference of a cross section, which is perpendicular to the longitudinal direction, of the folded airbag and the other end of the cover cloth sandwich an edge of the outer circumference of the folded airbag. In other words, the first folded-back part of the cover cloth is inserted into a folding gap of the folded airbag from the edge of the outer circumference of the folded airbag.

[0030] Therefore, at the time of deploying the airbag, because the cover cloth can be certainly released, the airbag is smoothly deployed in the expected deployment direction so that the edges of the front pillar trim covering and the rear pillar trim covering are not cracked and scattered.

Effects of the Invention

[0031] According to the present invention, in regard to the cover cloth, the first folded-back part that is provided at one end of the cover cloth in the circumferential direction of the outer circumference of the cross section, which is perpendicular to the longitudinal direction, of the folded airbag and the other end of the cover cloth sandwich the

edge of the outer circumference of the folded airbag. In other words, the first folded-back part of the cover cloth is inserted into the folding gap of the folded airbag from the edge of the outer circumference of the folded airbag.

[0032] Therefore, at the time of deploying the airbag, the cover cloth can be certainly released, without a deterioration of the deployment performance of the airbag. In accordance with the deployment of the cover cloth, the cover cloth extrudes the trim covering and covers the edge of the trim covering at an outlet (an opening) of the airbag. As a result, the cover cloth prevents the bag from being caught at the edge of the trim covering and helps the smooth deployment of the airbag. Therefore, because the edges of the front pillar trim covering and the rear pillar trim covering are not cracked and scattered, the safety of the occupants can be secured.

Brief Description of the Drawings

[0033] Figs. 1A, 1B and 1C are diagrams that explain principal parts of a curtain airbag device according to a first aspect of the present invention. Fig. 1A shows a state in which an insertion length of a first folded-back part of a cover cloth is maximum and a distance between a folded-back position of the cover cloth and a folded-back position of the airbag is minimum. Fig. 1B shows a state in which the insertion length of the first folded-back part of the cover cloth is minimum and the distance between the folded-back position of the cover cloth and the folded-back position of the airbag is maximum. Fig. 1C shows a state corresponding to an intermediate level between Figs. 1A and 1B.

[0034] Figs. 2A, 2B, 2C, and 2D are diagrams that explain a deploying state of the curtain airbag device in order from Fig. 2A to Fig. 2D according to the first aspect of the present invention.

[0035] Fig. 3 is a diagram that explains a mounting part in which the principal parts of the curtain airbag device are mounted on a vehicle according to the first aspect of the present invention.

[0036] Figs. 4A, 4B, and 4C are diagrams that explain a mounting state in which the principal parts of the curtain airbag device are mounted on the vehicle in order from Figs. 4A to Fig. 4C according to the first aspect of the present invention.

[0037] Fig. 5 is a diagram that explains another example of the mounting state in which the principal parts of the curtain airbag device are mounted on the vehicle according to the first aspect of the present invention.

[0038] Fig. 6 is a diagram that explains principal parts of a curtain airbag device according to a second aspect of the present invention.

[0039] Fig. 7A is a diagram that explains principal parts of a curtain airbag device according to a third aspect of the present invention. Fig. 7B is a diagram that explains principal parts of a curtain airbag device according to a fourth aspect of the present invention.

[0040] Fig. 8 is a diagram that shows another example

of a mounting state in which a curtain airbag device is mounted on a vehicle when viewed from a side of the vehicle.

[0041] Fig. 9 is a diagram that shows a mounting state in which a curtain airbag device is mounted on a vehicle when viewed from a side of the vehicle.

Mode for Carrying Out the Invention

[0042] An object of the present invention is to prevent edges of trim coverings, in particular, a front pillar trim covering and a rear pillar trim covering from being cracked and scattered at the time of deploying an airbag.

[0043] The object can be achieved by sandwiching an edge of an outer circumference of a folded airbag between a first folded-back part that is provided at one end of a cover cloth and the other end side. In other words, the object can be achieved by inserting the first folded-back part of the cover cloth into a folding gap of the folded airbag from the edge of the outer circumference of the folded airbag so as to cover the outer circumference of the airbag.

Embodiments

[0044] A curtain airbag device and a mounting structure of the curtain airbag device on a vehicle according to a first aspect of the present invention will be explained below with reference to Figs. 1 - 5.

[0045] A curtain airbag device 1 according to the present invention has an airbag 5 that is deployed in a curtain-like manner along a side window 6 (refer to Fig. 9) by a gas being ejected from an inflator 4 (refer to Fig. 9). Further, because of the deployment of the airbag 5, a seated occupant's head is protected, and at the same time, an occupant is prevented from being thrown out to the outside of a vehicle.

[0046] The airbag 5 is formed in a long state that is provided by being wound in, for instance, a roll state in a substantially up and down direction. Further, a body member 5a that is wound in the roll state has a second folded-back part 5b at an edge of an outer circumference of the body member 5a, and the second folded-back part 5b, which is folded back in a direction opposite to a winding direction of the body member 5a, covers a part of the outer circumference of the body member 5a.

[0047] A reference numeral 7 is a cover cloth that is provided at a part corresponding to a front pillar FP (refer to Fig. 9) of the airbag 5, which is wound in the roll state and in the long state. The cover cloth 7 is made by, for example, a webbing that is used for a vehicle seat belt, and alternatively made by a thick cloth that is thicker than a base fabric 5d that forms the airbag 5.

[0048] The cover cloth 7 has a length (refer to Fig. 3) that makes it possible to round around the outer circumference of the body member 5a of the airbag 5 that is wound in the roll state and has a first folded-back part 7a that is obtained by folding back one end side in a circum-

ferential direction of the outer circumference of a cross section which is perpendicular to a longitudinal direction of the airbag 5. Further, the first folded-back part 7a is inserted between the body member 5a and the second folded-back part 5b from a folded-back position 5c of the second folded-back part 5b of the airbag 5. As a result, the other end side 7b and the first folded-back part 7a of the cover cloth 7 sandwich the folded-back position 5c, and the outer circumference of the body member 5a of the airbag 5 is wrapped with it. Thereafter, it is fixed by a tape 8 (refer to Figs. 4A and 4B).

[0049] An insertion length L of the first folded-back part 7a of the cover cloth 7 and a distance d between a folded-back position 7c of the cover cloth 7 and the folded-back position 5c of the airbag 5 are not particularly limited so long as they are within the ranges shown in Figs. 1A - 1C.

[0050] That is, Fig. 1A shows a state in which the insertion length L of the first folded-back part 7a of the cover cloth 7 is maximum and the distance d between the folded-back position 7c of the cover cloth 7 and the folded-back position 5c of the airbag 5 is minimum.

[0051] Further, Fig. 1B shows a state in which the insertion length L of the first folded-back part 7a of the cover cloth 7 is minimum and the distance d between the folded-back position 7c of the cover cloth 7 and the folded-back position 5c of the airbag 5 is maximum.

[0052] Further, Fig. 1C shows a state in which the insertion length L of the first folded-back part 7a of the cover cloth 7 and the distance d between the folded-back position 7c of the cover cloth 7 and the folded-back position 5c of the airbag 5 are at the intermediate level between Figs. 1A and 1B.

[0053] In addition, the other end side 7b of the cover cloth 7 is attached to the base fabric 5d that is located at an upper end of the airbag 5, for instance, by sewing. Further, a tab 9 is sewn together with the base fabric 5d and the cover cloth 7 at, for instance, a center of the cover cloth 7 that is attached to the base fabric 5d in the longitudinal direction (refer to Fig. 3). Note that in Fig. 3, a reference numeral 10 corresponds to a sewing part in which the base fabric 5d, the cover cloth 7, and a tab 9 are integrally sewn and a reference numeral 5aa corresponds to an upper edge of the body member 5a that is wound in the roll state of the airbag 5.

[0054] The curtain airbag device 1 is mounted, by using the tab 9 that is attached to the base fabric 5d that is located at the upper end of the airbag 5, along with the inflator 4 on, for instance, the front pillar FP and the roof side rail RSR of the compartment so as to extend in a vehicle longitudinal direction of the vehicle (refer to Fig. 9). At that time, it is mounted on the front pillar FP by using a bracket 3 that is attached to the tab 9 at an attaching position of the cover cloth 7.

[0055] In a mounting structure of the curtain airbag device 1, at least a part of the cover cloth 7 is provided so as to overlap with an end part of a front pillar trim covering FPG on a side of a roof trim covering RG (refer to Fig.

4C). In the example shown in Fig. 4C, the entirety of the cover cloth 7 is overlapped with the end part of the front pillar trim covering FPG on the side of the roof trim covering RG.

[0056] Because the cover cloth 7 is much softer and easily deformed than the trim covering, the cover cloth 7 smoothly covers a lower end of the front pillar trim covering FPG when the front pillar trim covering FPG is pushed to open. Therefore, the cover cloth 7 is deployed so as to extend from the lower end of the front pillar trim covering FPG and helps the smooth deployment of the airbag 5.

[0057] Further, in the mounting structure of the curtain airbag device 1, as shown in Fig. 5, the cover cloth 7 may also be provided so as to span a seam S between the front pillar trim covering FPG and the roof trim covering RG on the side of the roof side rail.

[0058] When the cover cloth 7 is provided so as to span the seam S, the cover cloth 7 smoothly covers an opening lower end part of the seam between the front pillar trim covering FPG and the roof trim covering RG that open differently at the time of deploying the airbag 5. Therefore, because a level difference at a position of the opening lower end part is eliminated, it becomes possible to prevent the airbag 5 from being caught.

[0059] According to the mounting structures explained above, at the time of deploying the airbag 5, because a direct damage that is applied to the end part of the front pillar trim covering FPG on the side of the roof trim covering RG can be reduced, the cracking of the front pillar trim covering FPG can be prevented.

[0060] In the present invention, when the high load that is higher than a predetermined value is applied to a vehicle body side part due to the side collision or the rollover, the gas, which is ejected from the inflator 4 by receiving a signal from a sensor, is supplied to a chamber via a duct so that the airbag 5 is deployed in the curtain-like manner.

[0061] At the time of deploying the airbag 5, the second folded-back part 5b is deployed beginning of a storage state shown in Fig. 2A and then continuing of states shown in Figs. 2B to 2D in such order. Because of the deployment of the second folded-back part 5b, the first folded-back part 7a of the cover cloth 7 that is inserted between the body member 5a and the second folded-back part 5b of the airbag 5 can be certainly released.

[0062] Fig. 2A shows the state in which the airbag 5 is stored inside the front pillar FP. Once the airbag 5 starts to be deployed by the operation of the inflator, the second folded-back part 5b that is located at the compartment side with respect to the airbag 5 starts to be deployed and starts to push the front pillar trim covering FPG toward the compartment side (Fig. 2B).

[0063] As the expansion and the deployment are advanced, an opening O that is formed between the front pillar FP and the front pillar trim covering FPG is pushed and expanded. Even when the opening O is expanded, an area adjacent to the lower end of the cover cloth 7 still

remains in the opening because of further extending in a direction toward the front pillar from the lower end part of the front pillar trim covering FPG (Fig. 2C).

[0064] In spite of the state in which the opening O is completely opened and the body member 5a of the airbag 5 comes out from the front pillar trim covering FPG, the area adjacent to the lower end of the cover cloth 7 covers the lower end part of the front pillar trim covering FPG (Fig. 2D).

[0065] Thereafter, as the deployment of the airbag 5 is advanced, an end part 7aa of the first folded-back part 7a of the cover cloth 7 downwardly hangs down and deforms so as to eliminate a protrusion of the lower end part of the front pillar trim covering FPG. Therefore, because the airbag 5 is not caught by the lower end part of the front pillar trim covering FPG, the deployment is smoothly performed.

[0066] In the present invention explained above, the airbag 5 is deployed in the expected deployment direction and the edge of the front pillar trim covering FPG is not cracked and scattered.

[0067] It will be apparent that the present invention is not limited to the above examples and the above embodiments may be varied in many ways so long as such variations are included within the scope of the technical ideas recited in each of the claims.

[0068] Specifically, the embodiments that are explained with reference to Figs. 1-5 are preferred examples according to the present invention, and however, other embodiments can be carried out and performed in various ways. Unless there are restrictive descriptions in the specification, the present invention should not be limited to the detailed configurations, sizes, and arrangement of the parts shown in the attached drawings. Further, the expressions and terms in the specification are used for the purpose of explanations so that they should not be limited unless there are restrictive descriptions.

[0069] For instance, in the embodiments shown in Figs. 1 - 5, the airbag 5 that is folded in the roll state is shown. However, as shown in Fig. 6, it can also be adopted that the airbag 5 is folded in a bellows-like manner and a third folded-back part 5e that is obtained by folding back one end of the airbag 5 covers a part of the outside of the airbag 5.

[0070] Further, with respect to the airbag 5 that is folded in the roll state, it can also be adopted that the second folded-back part 5b is not provided as shown in Fig. 7A. Further, with respect to the airbag 5 that is folded in the bellows-like manner, it can also be adopted that the third folded-back part 5e is not provided as shown in Fig. 7B.

[0071] Further, in the embodiments explained above, the damage prevention for the front pillar trim covering FPG is explained. However, as shown in Fig. 8, when the airbag 5 is provided even to cover a rear pillar RP, the damage of a rear pillar trim covering at the time of deploying the airbag 5 can be prevented as well by adopting the same configuration.

[0072] Further, in the embodiments explained above,

the cover cloth 7, which is made by the fabric that is thicker than the base fabric 5d forming the airbag 5 or with the harder fabric such as a webbing, is explained. However, as a material of the cover cloth 7, any material that is harder than the base fabric 5d forming the airbag 5 and at the same time that is softer than the trim covering can be used.

Explanation of Reference Signs

[0073]

1	Curtain Airbag Device
4	Inflator
5	Airbag
5a	Body Member
5b	Second Folded-Back Part
5d	Base Fabric
5e	Third Folded-Back Part
6	Side Window
7	Cover Cloth
7a	First Folded-Back Part
7aa	End Part
7b	the other end side
9	Tab
FP	Front Pillar
FPG	Front Pillar Trim Covering
RSR	Roof Side Rail
RG	Roof Trim Covering
RP	Rear Pillar

Claims

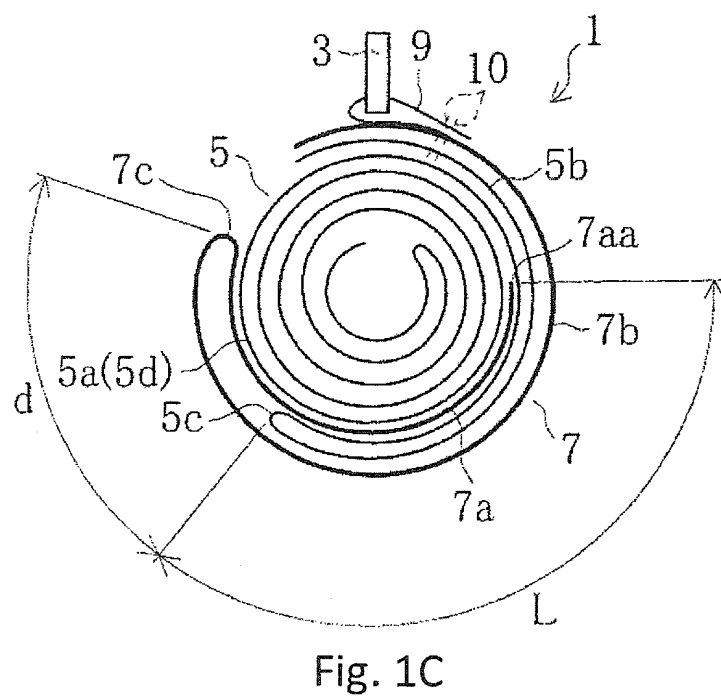
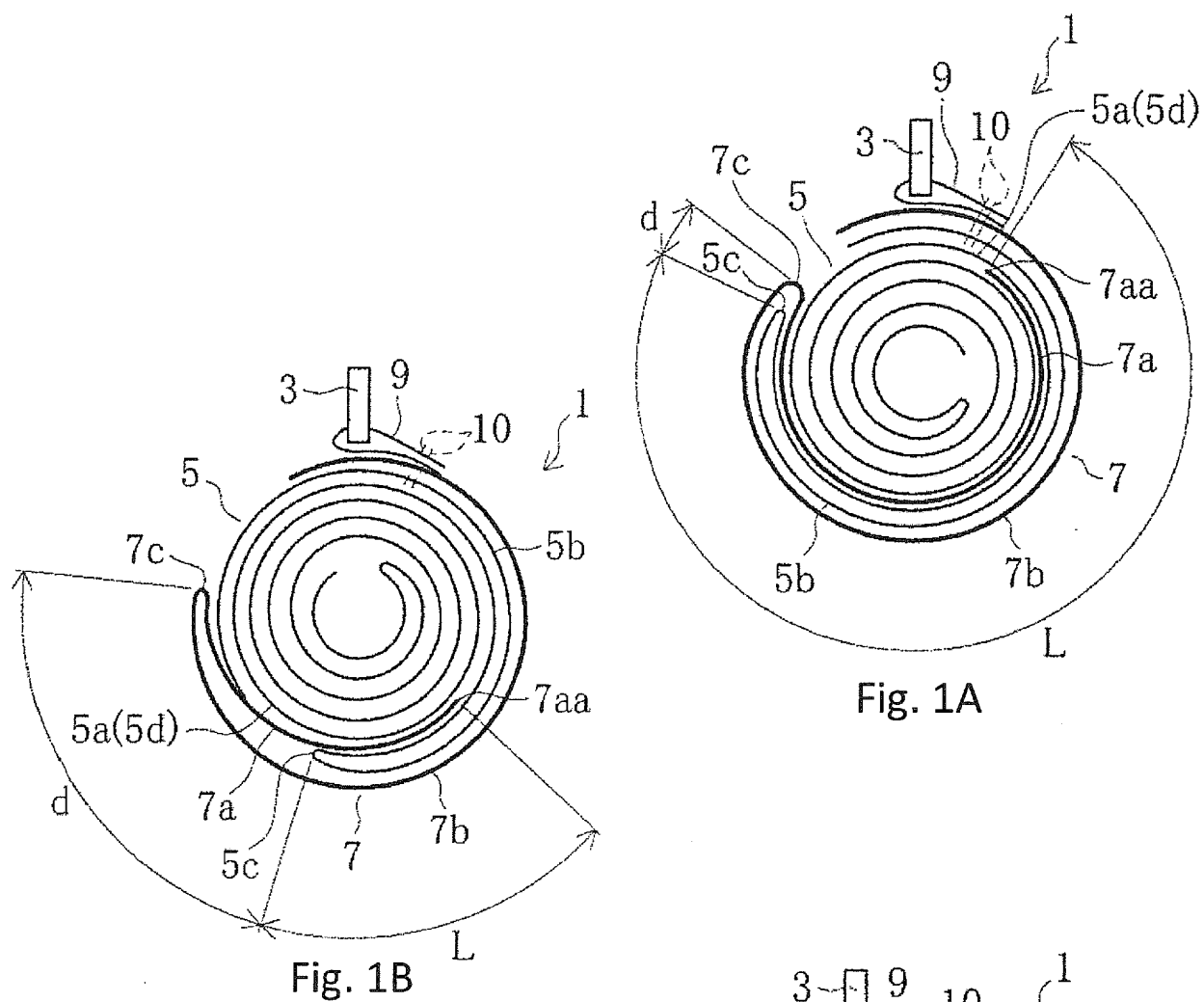
1. A curtain airbag device having an airbag that is mountable along a roof side rail of a vehicle in a vehicle longitudinal direction of the vehicle so as to be configured to be stored in the vehicle and that is configured to be deployed in a curtain-like manner along a side window in a vehicle compartment by a gas generated by an inflator in case of emergency, the curtain airbag device comprising:

a cover cloth that is provided at the airbag which is folded, the cover cloth being wound to cover at least part of an outer circumference of the airbag that extends in a longitudinal direction of the airbag; and

a first folded-back part that is provided at the cover cloth, the first folded-back part being configured by folding back one end of the cover cloth in a circumferential direction of the outer circumference of a cross section, which is perpendicular to the longitudinal direction, of the folded airbag,

wherein an edge of the outer circumference of the folded airbag is held between the first folded-back part and the other end of the cover cloth.

2. A curtain airbag device having an airbag that is mountable along a roof side rail of a vehicle in a vehicle longitudinal direction of the vehicle so as to be configured to be stored in the vehicle and that is configured to be deployed in a curtain-like manner along a side window in a vehicle compartment by a gas generated by an inflator in case of emergency, the curtain airbag device comprising:
 - a cover cloth that is provided at the airbag which is folded, the cover cloth being wound to cover at least part of an outer circumference of the airbag that extends in a longitudinal direction of the airbag; and
 - a first folded-back part that is provided at the cover cloth, the first folded-back part being configured by folding back one end of the cover cloth in a circumferential direction of the outer circumference of a cross section, which is perpendicular to the longitudinal direction, of the folded airbag,
 - wherein the first folded-back part is inserted into a folding gap of the folded airbag from an edge of the outer circumference of the folded airbag.
3. The curtain airbag device according to claim 1 or claim 2, wherein a shape of the folded airbag is configured by winding the airbag in a roll state.
4. The curtain airbag device according to claim 3, wherein the airbag that is wound in the roll state has a second folded-back part, and the second folded-back part is configured by folding back an edge of the outer circumference of the airbag in a direction opposite to a winding direction to cover part of the outer circumference of the airbag, and the first folded-back part of the cover cloth is inserted into a gap between a main body of the airbag that is wound in the roll state and the second folded-back part.
5. The curtain airbag device according to claim 1 or claim 2, wherein the folded airbag is configured by folding back the airbag in a bellows-like manner.
6. The curtain airbag device according to claim 5, wherein the airbag that is folded back in the bellows-like manner has a third folded-back part at one end of the bellows-like folded airbag, and the third folded-back part is configured by folding back an edge of the folded airbag so as to cover part of an outside of the folded airbag, and the first folded-back part of the cover cloth is inserted into a gap between a main body of the airbag that is folded back in the bellows-like manner and the third folded-back part.
7. The curtain airbag device according to one of claims 1-6, wherein the cover cloth is a thicker fabric that is thicker than a base fabric that configures the airbag.
8. The curtain airbag device according to one of claims 1-6, wherein the cover cloth is a harder fabric that is harder than a base fabric that configures the airbag.
9. A mounting structure of the curtain airbag device according to one of claims 1-8 on a vehicle, the mounting structure comprising:
 - when the airbag is mounted on the roof side rail and a pillar of the vehicle by using a tab that is attached to a base fabric of the airbag so that the airbag extends in the vehicle longitudinal direction, the airbag is mounted by using the tab that is integrally attached to the cover cloth and the base fabric of the airbag at a mounting position of the cover cloth.
10. The mounting structure according to claim 9, wherein the pillar is a front pillar.
11. The mounting structure according to claim 9, wherein the pillar is a rear pillar.
12. The mounting structure according to claim 9, wherein the pillar is each of a front pillar and a rear pillar.
13. The mounting structure according to one of claims 9-12, wherein at least part of the cover cloth is overlapped with an edge of a roof trim covering side of the roof side rail of a pillar trim covering of the pillar.
14. The mounting structure according to one of claims 9-12, wherein the cover cloth is disposed at a seam between a pillar trim covering of the pillar and a roof trim covering of the roof side rail.



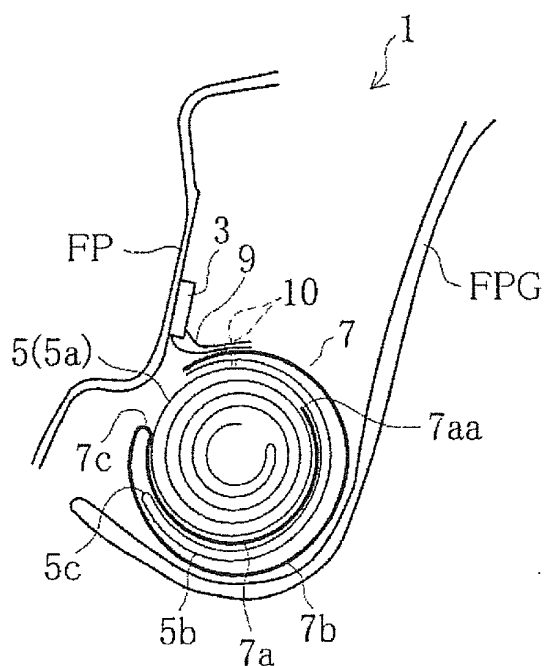


Fig. 2A

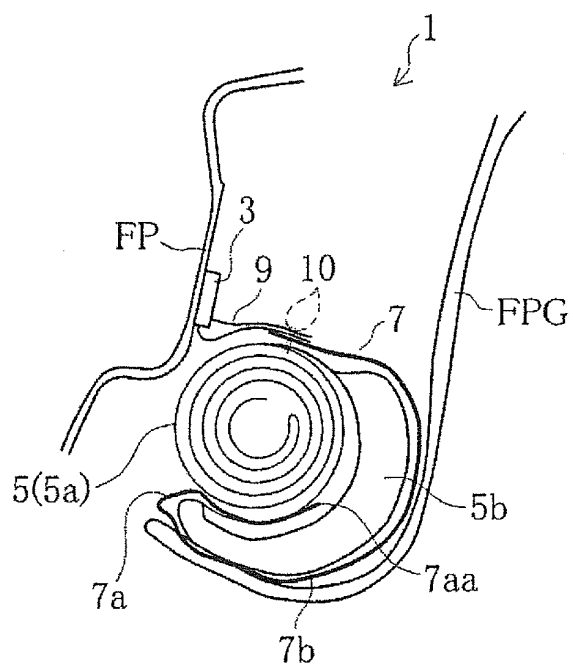


Fig. 2B

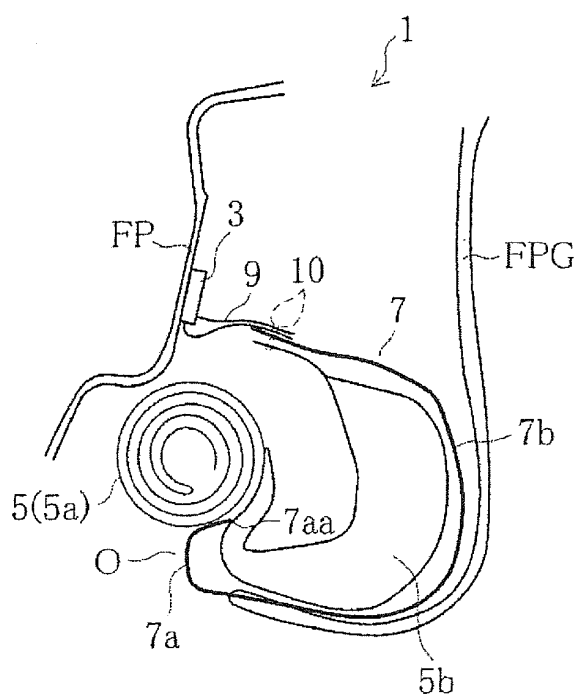


Fig. 2C

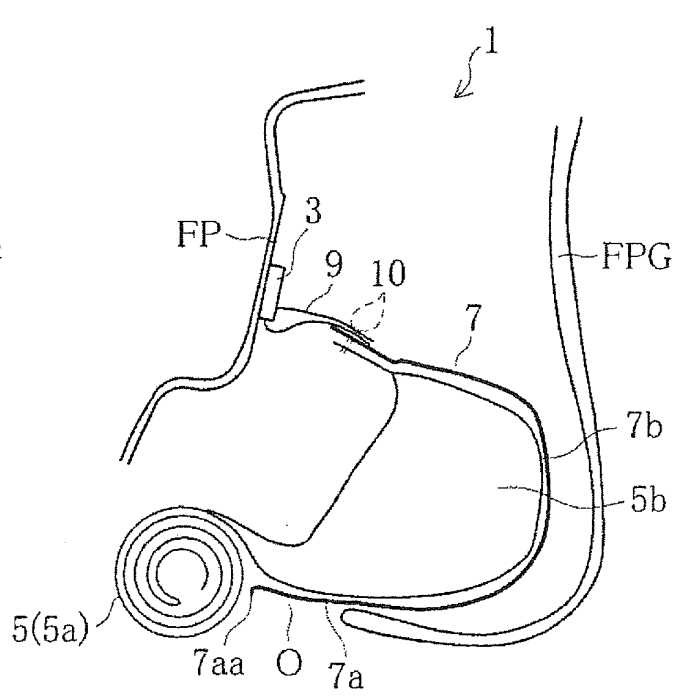


Fig. 2D

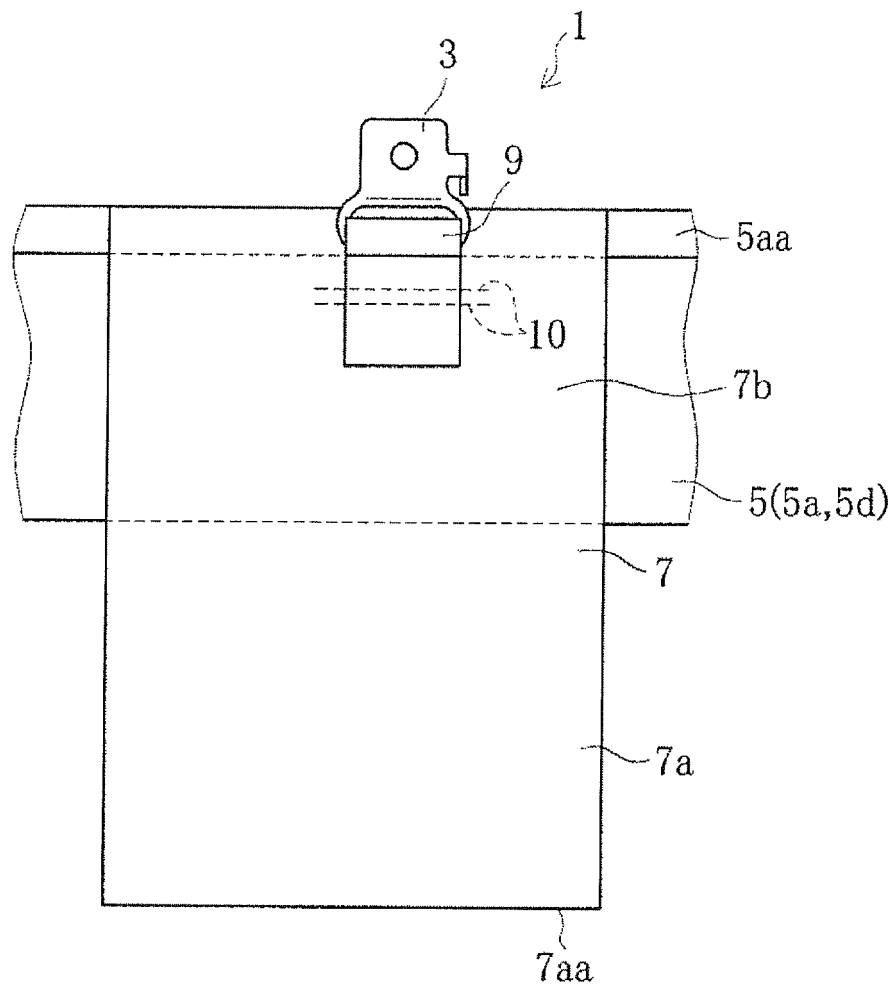


Fig. 3

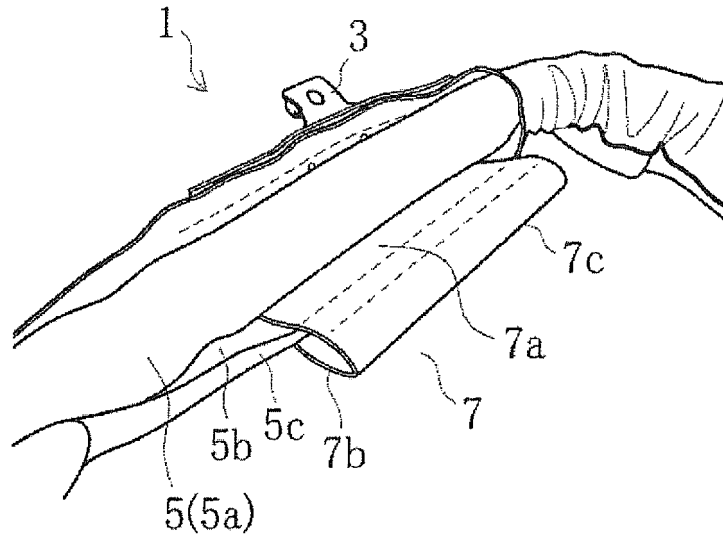


Fig. 4A

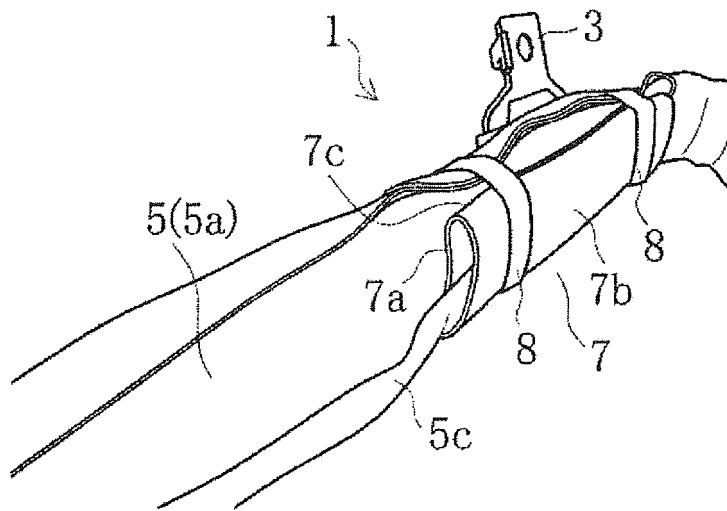


Fig. 4B

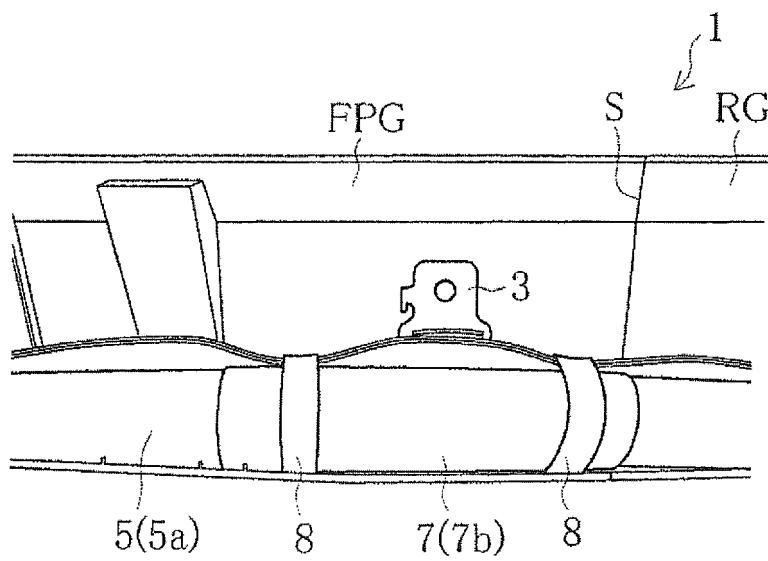


Fig. 4C

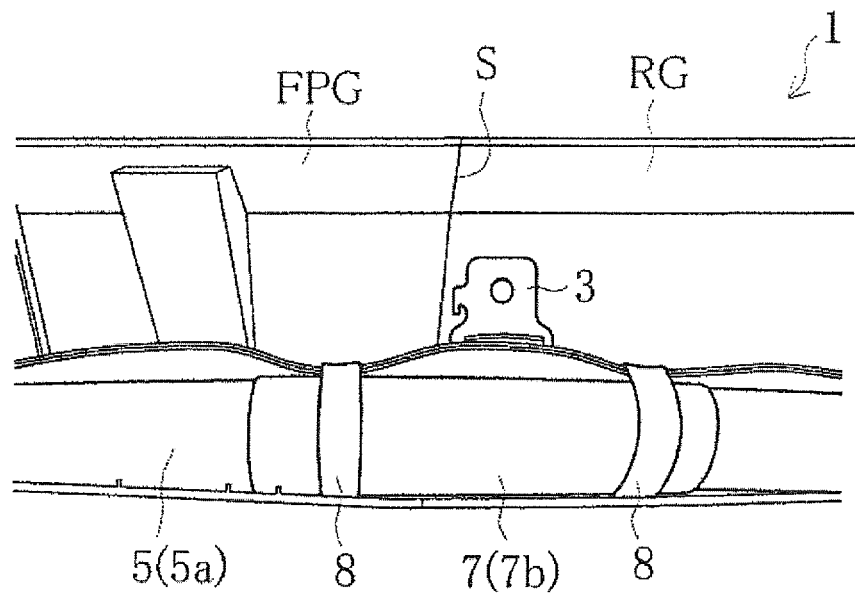


Fig. 5

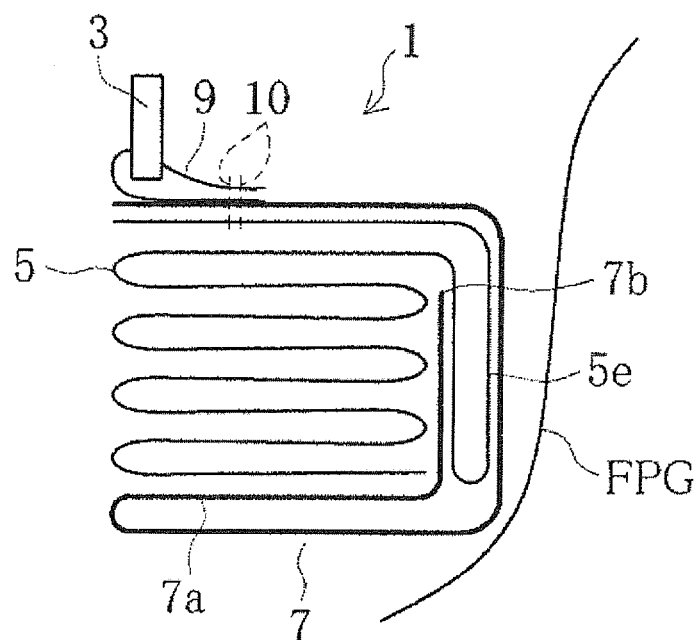


Fig. 6

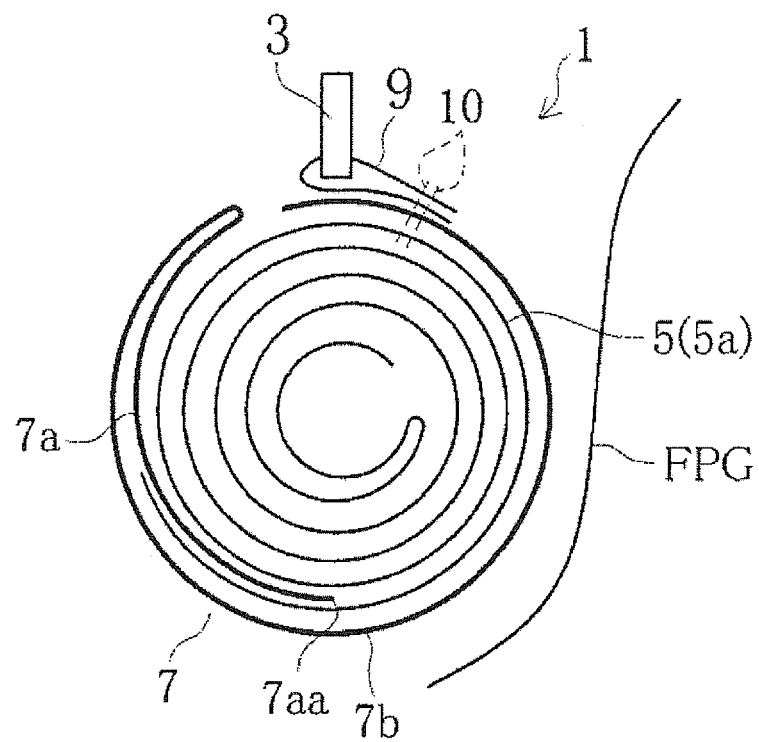


Fig. 7A

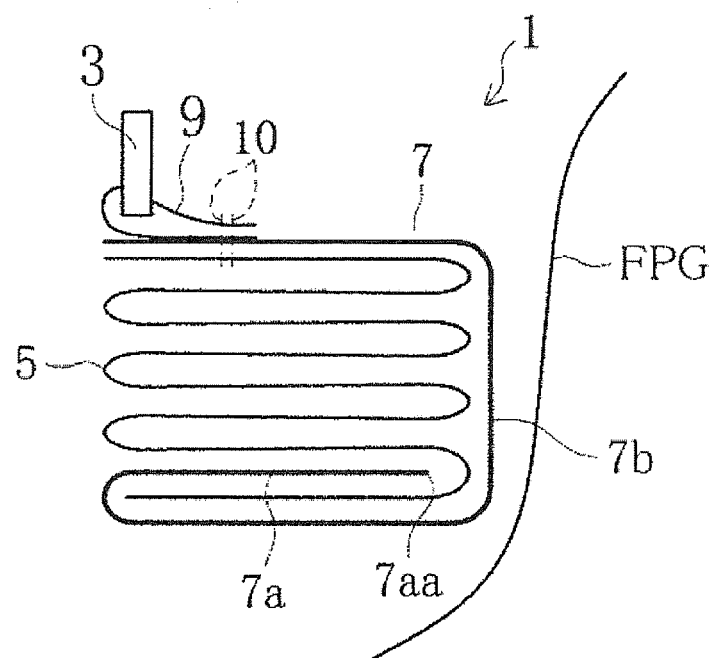


Fig. 7B

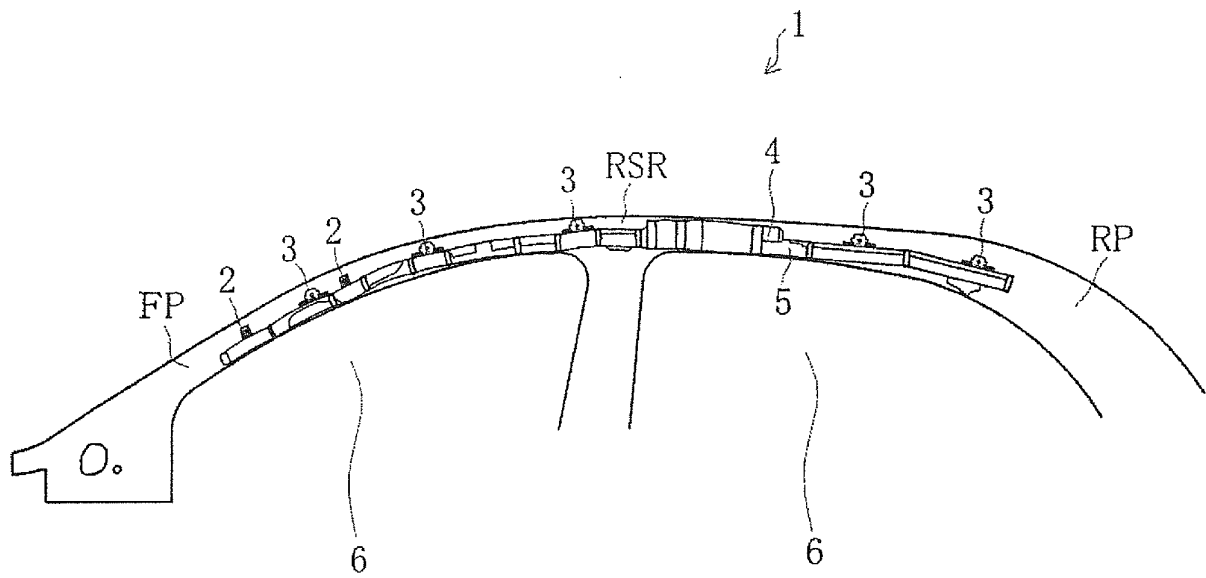


Fig. 8

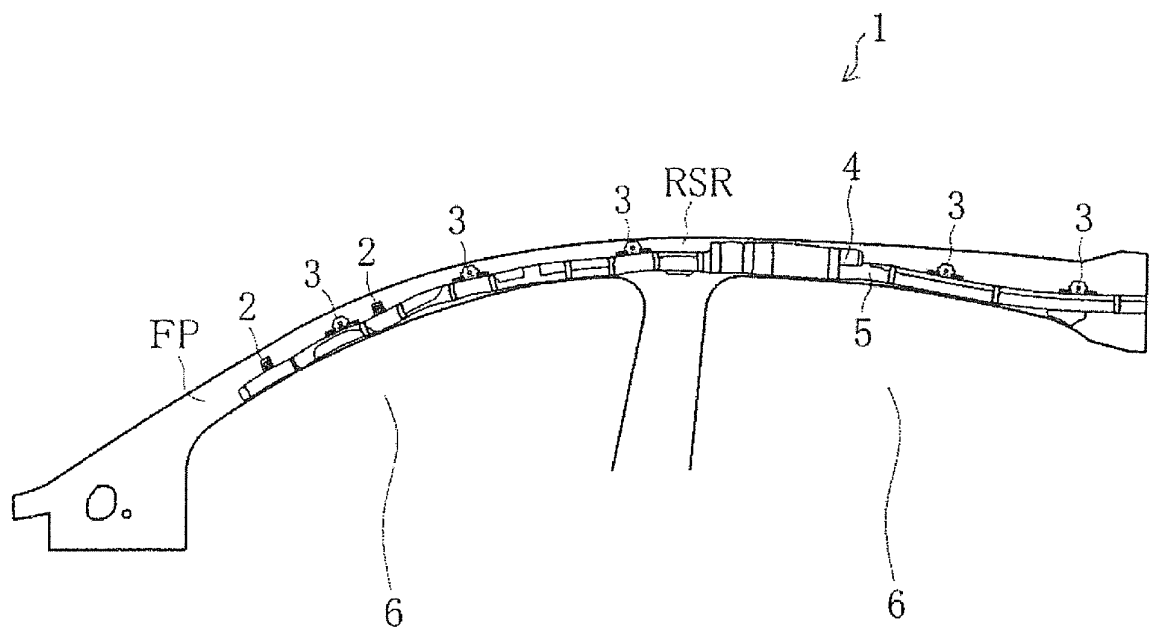


Fig. 9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/085057

A. CLASSIFICATION OF SUBJECT MATTER

B60R21/213(2011.01)i, B60R21/237(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B60R21/213, B60R21/237

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2016

Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2011-246078 A (Takata Corp.), 08 December 2011 (08.12.2011), paragraphs [0005], [0013] to [0016], [0020] to [0029], [0033]; fig. 1 to 3 & US 2011/0291393 A1 paragraphs [0007] to [0008], [0019] to [0036], [0045] to [0082], [0096]; fig. 1 to 3 & EP 2390144 A1 & CN 102294986 A	1-3, 5 4, 6-14
Y	JP 2009-126476 A (Autoliv Development AB.), 11 June 2009 (11.06.2009), paragraphs [0004], [0025] to [0026]; fig. 3 (Family: none)	4, 7-14

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search

27 December 2016 (27.12.16)

Date of mailing of the international search report

10 January 2017 (10.01.17)

Name and mailing address of the ISA/

Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/085057

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2013-208978 A (Takata Corp.), 10 October 2013 (10.10.2013), paragraphs [0007] to [0008], [0030] to [0036]; fig. 6 & WO 2013/146076 A1	6-14
Y	JP 2006-103478 A (Honda Motor Co., Ltd.), 20 April 2006 (20.04.2006), paragraph [0033]; fig. 5 (Family: none)	7-14
Y	JP 2010-006101 A (Mazda Motor Corp.), 14 January 2010 (14.01.2010), paragraphs [0030] to [0032]; fig. 5 (Family: none)	8-14

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2014065329 A [0010]